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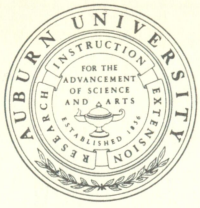


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GEOLOGICAL SURVEY OF ALABAMA

WALTER B. JONES, STATE GEOLOGIST

BULLETIN 56

# NATURAL WATER LOSSES FROM SELECTED DRAINAGE BASINS IN ALABAMA

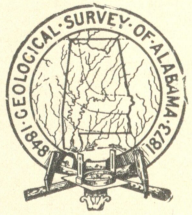
Prepared under the direction of

EDWARD B. RICE and CLAYTON H. HARDISON

by

THE DISTRICT OFFICE, WATER RESOURCES BRANCH
UNITED STATES GEOLOGICAL SURVEY

in Cooperation with
GEOLOGICAL SURVEY OF ALABAMA




UNIVERSITY, ALABAMA

JULY, 1945

WETUMPKA PRINTING CO
Printers and Publishers
Wetumpka, Ala.
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# LETTER OF TRANSMITTAL

University, Alabama

June 26. 1945

Honorable Chauncey Sparks

Governor of Alabama

Montgomery, Alabama

Sir:

I have the honor to transmit herewith the manuscript of a report on the "Natural Water Losses from Selected Drainage Basins in Alabama", by The District Office, Water Resources Branch, United States Geological Survey, in Cooperation with Geological Survey of Alabama. It is requested that this be printed as Bulletin 56 of the Geological Survey of Alabama.

Respectfully,

WALTER B. JONES

State Geologist

A

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# NATURAL WATER LOSSES FROM SELECTED DRAINAGE BASINS IN ALABAMA[1]

Prepared under the direction of

EDWARD B. RICE and CLAYTON H. HARDISON

## SYNOPSIS

Since 1899, the Geological Survey of Alabama has cooperated with the United States Geological Survey in the collection of data on surface-water in Alabama. During the last ten years, this cooperative program has been expanded to make possible the operation of numerous stream-flow measuring stations strategically located over the State. In addition to the stream-flow measuring stations operated on a cooperative arrangement between the State and Federal Surveys, others are supported in whole or in part by funds furnished by the Corps of Engineers, United States Army; and the Tennessee Valley Authority; some are supported entirely from Federal Survey funds; and a few others are operated by the Alabama Power Company, under general supervision of the Federal Survey, in connection with Federal Power Commission projects.

As used in this report, the natural water loss of a drainage basin is the difference between the average rainfall over the basin and the runoff from the basin for a given period. By studying the nature and amount of this loss and using this information in conjunction with precipitation records, which in most areas antedate runoff records from 30 to 50 years, engineers and hydrologists are able to make inferences concerning runoff for those earlier years and thus be in a better position to estimate the runoff that is likely to occur in the future. Although the results of such a study may be of considerable value, particularly when it is proposed to control the entire yearly flow from a basin, they can never approach the value of a reliable record of daily discharge collected at a stream-gaging station. It is also possible that studies of natural water loss for a given area will indicate a gradual trend in natural water-loss characteristics due to man-made changes and developments.

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[1]Published with the approval of the Director, Geological Survey, United States Department of the Interior.

## WATER LOSS

Evaporation from the ground and water surfaces, transpiration by plant life, and deep seepage account for an average of about 35 inches of water loss annually in Alabama, which amount is equal to about two-thirds of the annual precipitation. This is a loss only in the sense that it does not produce runoff, as part of this loss supports vegetation and part of it goes to replenish ground water.

The water loss for any given year may be affected by a variation in the amount of water held in storage at the beginning and at the end of the year. This effect is minimized by using the water year ending September 30, because usually at that time storage of water in the form of snow or ice; or in ponds, lakes, and swamps; or as ground water, is the lowest of the year.

Although movement of water deep in the ground does not necessarily follow surface drainage-area lines, the loss resulting from this influence is usually small in comparison with other losses. Any influence from this source in the basins studied is reflected in the water loss and thus becomes one of the many factors which together produce the water-loss characteristic of the basin.

As used in this report, the water loss of a drainage basin is the difference between the average rainfall and runoff for a given period; therefore, it is referred to as P - R to avoid confusion with other conceptions of water loss.

## PRECIPITATION

Precipitation is condensed moisture from the atmosphere that reaches the earth in the form of rain, snow, hail, or sleet. From United States Weather Bureau data, the average annual precipitation on Alabama for the 60 years ending December 31, 1943, was 52.91 inches. The average annual precipitation (see plate 1) for the same period on the northern division of the State was 52.36, on the middle division 51.31, and on the southern division 56.96 inches.

For the four years October 1, 1939 to September 30, 1943, covered by plate 2, the average annual precipitation on the State was 49.48; on the northern division 45.88; on the middle division 49.49; and on the southern division 57.03.

The accuracy of the values of average precipitation on a basin is largely determined by the number and spacing of the precipitation gages. The precipitation records that were used in the computations for this report are those published by the United States Weather Bureau and are from gages fairly well distributed over the State with an average density of one gage for each 400 square miles. The precipitation for each year on the drainage area for which data have been tabulated and for each intervening area used in the preparation of plate 2 was computed by the Thiessen method as explained in the United States Weather Bureau publication, "Monthly Weather Review, July 1911". The average precipitation on each drainage area for the period of years covered is given in the tabulation for each station.

## RUNOFF

The runoff, or the portion of the precipitation that appears as flow in streams, may be measured as the depth in inches to which the drainage area above the gaging station would be covered if all the water draining from it during a given period (a water year, October 1 to September 30, inclusive, in this study), were uniformly distributed on the surface at one time.

The values for runoff, depth in inches, as given in this report differ slightly in some instances from those previously published in United States Geological Survey water-supply papers. These changes were necessitated by the revision of drainage areas above the gaging stations.

In addition to the location and drainage area, the station description for each station gives the average runoff for the total period of record, so that this value can be readily compared with the average runoff for the period for which both precipitation and runoff records are presented.

In the preparation of plate 2, consideration was given to the precipitation and runoff on intervening areas; that is, the flow of all stations immediately upstream was subtracted from a downstream station to determine runoff from the ungaged area. This procedure is frequently subject to large error, especially when the intervening area is but a small portion of the area of the downstream station, and the results are not deemed sufficiently reliable for publication but have been used to define the precipitation-effect factor in areas where no other information was available.

## PRECIPITATION-EFFECT FACTOR

Of the many factors that influence the variation in water loss from year to year, the most important is precipitation. Temperature and other factors have an influence on water loss, but the opportunity to exert this influence is dependent on the amount and distribution of precipitation.

However, this does not mean that water loss bears a fixed ratio to precipitation, because there is little runoff until the initial demands of vegetation and the soil have been met.

A study of the data tabulated in this report indicates that of all the various rules and formulas[2] that have been proposed to express this relation, the formula $P - R = KP + 10$, in which K is an empirical coefficient, appears to be representative of average conditions throughout Alabama. The water-loss characteristic of a basin is reflected in the coefficient K which may be termed the precipitation-effect factor.

This formula is given and used (see tables 1, 2, and 3) as an example of the way in which the data in this report may be used and it should be recognized that, like all other formulas that have been proposed, it will give only approximate results because so much depends on the intensity and distribution of the precipitation. It is probable that a more thorough analysis of base data, such as are given in this report, when used in combination with temperature and other factors might lead to a more complex relationship that would give more consistent results.

## PRESENTATION OF DATA

The drainage basins selected for inclusion in this report are those with an area of less than 2,500 square miles lying south of the Tennessee River Basin, for which precipitation and runoff data are available for four or more years. They are for the most part free from the effect of any extensive diversion, and do not include areas of widely different climatologic and hydrologic conditions. The basic period used is the water year ending September 30. The statistical information is given for 32 drainage areas with an aggregate period of 218 station-years. The information

[2]For a discussion of several such rules and formulas see D. W. Mead, Hydrology, chaps. 17 and 18, McGraw-Hill Book Co., 1919.

given for the drainage areas is arranged in the same geographic order that is followed in United States Geological Survey water-supply papers; that is, in each of the major drainage basins in Alabama, the information for gaging stations on the main stream is presented first, in downstream order, and then that for the stations on tributary basins is listed in similar manner beginning with the uppermost basin.

The average annual precipitation on Alabama is shown in plate 1 and the precipitation-effect factor in different parts of the State is shown in plate 2. The data used in the preparation of plate 1 are from United States Weather Bureau records. Plate 2 is based on data for the four years October 1, 1939 to September 30, 1943, for each upstream station given in the tabulations, and for each drainage area lying between gaging stations on main stem or tributary streams. In computing runoff data on these intervening areas, use was made of all available runoff records for the four-year period regardless of the limitation on drainage-area size noted above, and in a few instances adjustments were made for diversion or for change in storage. A graphical solution of the relation between precipitation and runoff for various values of the precipitation-effect factor is shown in plate 3.

An evaluation of the accuracy that may be obtained when annual runoff is computed from precipitation records through use of formula $P - R = KP + 10$ is shown by tables 1, 2, and 3. These tables show the variation between the computed annual runoff and the observed annual runoff for three gaging stations with a total of 53 years of record. The precipitation-effect factor used for each station was determined from the last four years of record at each station.

## SUMMARY

The tabulated data in this report are based on reliable official records. However, the relation between precipitation and runoff suggested herein is but an empirical formula so derived as to show the water-loss characteristics in various parts of the State and should be used with caution. This formula merely demonstrates one way in which annual runoff can be computed from precipitation records.

Any relation between precipitation, water loss, and runoff will but serve as a useful tool in the estimation of probable stream

flow and cannot be expected to supply stream-flow information equivalent to a continuous record of stream flow obtained at a stream-gaging station.

## CHOCTAWHATCHEE RIVER BASIN

### Choctawhatchee River near Newton, Dale County

**Location.**—Lat. 31°21′, long. 85°37′, in SE¼ sec. 2, T. 4 N., R. 24 E., at bridge on U. S. Highway 231, 200 feet downstream from mill dam, 1500 feet upstream from Hurricane Creek, 0.8 mile north of Newton, and one mile downstream from Atlantic Coast Line Railroad bridge.

**Drainage area.**—693 square miles.

**Average runoff.**—12 years (1923-24, 1926-27, 1936-43), 19.00 inches.

**Remarks.**—Some regulation at low flow by small grist mills above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1936 | 68.72 | 22.36 | 46.36 |
| 1937 | 63.45 | 20.54 | 42.91 |
| 1938 | 52.79 | 19.07 | 33.72 |
| 1939 | 66.76 | 20.82 | 45.94 |
| 1940 | 44.60 | 18.10 | 26.50 |
| 1941 | 43.68 | 11.10 | 32.58 |
| 1942 | 56.87 | 17.90 | 38.97 |
| 1943 | 55.38 | 22.56 | 32.82 |
| Average | 56.53 | 19.06 | 37.47 |

### Pea River near Ariton, Dale County

**Location.**—Lat. 31°35′, long. 85°47′, in SW¼ sec. 7, T. 7 N., R. 23 E., at bridge on U. S. Highway 231, 300 feet downstream from small mill dam, 2¼ miles downstream from Atlantic Coast Line Railroad bridge, and 3½ miles west of Ariton.

**Drainage area.**—500 square miles.

**Remarks.**—Some regulation at low flow by small mills above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1939 | 56.84 | 18.05 | 38.79 |
| 1940 | 45.83 | 16.56 | 29.27 |
| 1941 | 38.22 | 7.92 | 30.30 |
| 1942 | 57.14 | 17.59 | 39.55 |
| 1943 | 61.51 | 23.46 | 38.05 |
| Average | 51.91 | 16.72 | 35.19 |

## CHOCTAWHATCHEE RIVER BASIN—Continued

### Pea River near Samson, Geneva County

**Location.**—Lat. 31°07′, long. 86°06′, in sec. 25, T. 2 N., R. 19 E., at bridge on State Highway 12, 500 feet downstream from Boyenton Creek, 1¾ miles downstream from Louisville and Nashville Railroad bridge, 3 miles west of Samson, and 6½ miles upstream from Flat Creek.

**Drainage area.**—1,170 square miles.

**Average runoff.**—18 years (1905-12, 1924-25, 1936-43), 19.45 inches.

**Remarks.**—Low flow regulated by hydroelectric plant 25 miles above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1936 | 61.04 | 26.10 | 34.94 |
| 1937 | 60.72 | 22.29 | 38.43 |
| 1938 | 54.13 | 23.24 | 30.89 |
| 1939 | 61.91 | 20.38 | 41.53 |
| 1940 | 45.58 | 18.85 | 26.73 |
| 1941 | 40.42 | 10.04 | 30.38 |
| 1942 | 57.43 | 19.16 | 38.27 |
| 1943 | 60.40 | 24.26 | 36.14 |
| Average | 55.20 | 20.54 | 34.66 |

## ESCAMBIA RIVER BASIN

### Escambia River at Flomaton, Escambia County.

**Location.**—Lat. 31°01′, long. 87°15′, in NE¼ sec. 33, T. 1 N., R. 8 E., at bridge on U. S. Highway 31 at north edge of Flomaton, 1¼ miles upstream from Louisville and Nashville Railroad bridge, 1½ miles upstream from Alabama-Florida State line, and about 4 miles upstream from Conecuh River.

**Drainage area.**—325 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 49.49 | 23.67 | 25.82 |
| 1941 | 51.52 | 18.39 | 33.13 |
| 1942 | 67.37 | 27.75 | 39.62 |
| 1943 | 59.92 | 26.90 | 33.02 |
| Average | 57.08 | 24.18 | 32.90 |

## ESCAMBIA RIVER BASIN—Continued

### Conecuh River at Brantley, Crenshaw County.

**Location.**—Lat. 31°34′, long. 86°15′, in SE¼ sec. 16, T. 7 N., R. 18 E., at bridge on State Highway 52, half a mile downstream from Moody's Mill Creek and three-quarters of a mile southeast of Brantley.

**Drainage area.**—485 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1938 | 53.81 | 24.03 | 29.78 |
| 1939 | 62.78 | 22.60 | 40.18 |
| 1940 | 46.88 | 17.59 | 29.29 |
| 1941 | 43.53 | 10.29 | 33.24 |
| 1942 | 56.02 | 19.11 | 36.91 |
| 1943 | 61.17 | 25.83 | 35.34 |
| Average | 54.03 | 19.91 | 34.12 |

### Conecuh River near Andalusia, Covington County.

**Location.**—Lat. 31°16′, long. 86°36′, in NE¼ sec. 1, T. 3 N., R. 14 E., at Simmons Bridge on State Highway 83, 7½ miles southwest of Andalusia.

**Drainage area.**—1,300 square miles.

**Average runoff.**—29 years (1905-19, 1930-43), 19.64 inches.

**Remarks.**—Flow regulated by hydroelectric plants and reservoirs above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1930 | 56.18 | 22.73 | 33.45 |
| 1931 | 51.33 | 17.64 | 33.69 |
| 1932 | 50.37 | 13.24 | 37.13 |
| 1933 | 60.34 | 22.92 | 37.42 |
| 1934 | 45.82 | 10.99 | 34.83 |
| 1935 | 56.10 | 16.77 | 39.33 |
| 1936 | 62.55 | 26.86 | 35.69 |
| 1937 | 61.15 | 23.70 | 37.45 |
| 1938 | 56.91 | 25.60 | 31.31 |
| 1939 | 64.00 | 23.03 | 40.97 |
| 1940 | 48.85 | 19.16 | 29.69 |
| 1941 | 47.17 | 11.19 | 35.98 |
| 1942 | 58.78 | 19.40 | 39.38 |
| 1943 | 60.47 | 25.87 | 34.60 |
| Average | 55.72 | 19.94 | 35.78 |

## ESCAMBIA RIVER BASIN—Continued

### Conecuh River near Brooklyn (eastern Escambia County)

**Location.**—Lat. 31°10′, long. 86°48′, in W½ sec. 6, T. 2 N., R. 13 E., at bridge on U. S. Highway 29, 3 miles downstream from Sepulga River and 7 miles southwest of Brooklyn.

**Drainage area.**—2,400 square miles.

**Remarks.**—Flow regulated at low and medium stages by hydroelectric plants and reservoirs above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1936 | 60.22 | 26.02 | 34.20 |
| 1937 | 61.92 | 21.77 | 40.15 |
| 1938 | 57.03 | 24.37 | 32.66 |
| 1939 | 61.12 | 21.34 | 39.78 |
| 1940 | 57.24 | 20.07 | 37.17 |
| 1941 | 52.50 | 12.42 | 40.08 |
| 1942 | 53.65 | 20.51 | 33.14 |
| 1943 | 60.60 | 25.01 | 35.59 |
| Average | 58.04 | 21.44 | 36.60 |

### Sepulga River near McKenzie (eastern Conecuh County)

**Location.**—Lat. 31°27′, long. 86°47′, in SE¼ sec. 30, T. 6 N., R. 13 E., at Watt Bridge on U. S. Highway 31, three-eighths of a mile upstream from Old Town Creek, 2½ miles upstream from Piney Woods Creek, 5½ miles downstream from Persimmon Creek, and 7 miles southwest of McKenzie.

**Drainage area.**—470 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1938 | 56.74 | 21.90 | 34.84 |
| 1939 | 61.15 | 15.80 | 45.35 |
| 1940 | 50.99 | 18.68 | 32.31 |
| 1941 | 47.19 | 13.03 | 34.16 |
| 1942 | 61.91 | 19.89 | 42.02 |
| 1943 | 59.30 | 19.26 | 40.04 |
| Average | 56.21 | 18.09 | 38.12 |

## ESCAMBIA RIVER BASIN—Continued

### Pigeon Creek near Thad, Covington County.

**Location.**—Lat. 31°29′, long. 86°39′, in NE¼NW¼ sec. 21, T. 6 N., R. 14 E., at bridge on State Highway 55, 1½ miles upstream from Louisville and Nashville Railroad bridge, 2 miles southeast of Thad, 3 miles upstream from Reedy Creek, and 5½ miles southeast of McKenzie.

**Drainage area.**—296 square miles.

**Remarks.**—Some diurnal fluctuations caused by small mill 200 feet above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1938 | 58.90 | 23.71 | 35.19 |
| 1939 | 59.76 | 20.64 | 39.12 |
| 1940 | 54.88 | 19.96 | 34.92 |
| 1941 | 46.35 | 13.85 | 32.50 |
| 1942 | 65.69 | 22.68 | 43.01 |
| 1943 | 57.88 | 22.73 | 35.15 |
| Average | 57.24 | 20.60 | 36.64 |

### Murder Creek near Evergreen, Conecuh County.

**Location.**—Lat. 31°25′, long. 87°00′, in NW¼ sec. 8, T. 5 N., R. 11 E., at bridge on U. S. Highway 31, 1 mile upstream from Louisville and Nashville Railroad bridge, and 2½ miles southwest of Evergreen.

**Drainage area.**—169 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1938 | 53.10 | 25.88 | 27.22 |
| 1939 | 65.54 | 20.24 | 44.30 |
| 1940 | 45.60 | 18.39 | 27.21 |
| 1941 | 50.60 | 17.00 | 33.60 |
| 1942 | 55.18 | 21.27 | 33.91 |
| 1943 | 63.79 | 22.61 | 41,18 |
| Average | 55.47 | 20.90 | 34.57 |

## MOBILE RIVER BASIN

### Little River near Jamestown, Cherokee County.

**Location.**—Lat. 34°24′, long. 85°38′, in NE¼ sec. 30, T. 7 S., R. 10 E., at highway bridge, a quarter of a mile upstream from Yellow Creek and 2½ miles west of Jamestown.

**Drainage area.**—121 square miles.

MOBILE RIVER BASIN—Continued

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1929 | 60.25 | 36.63 | 23.62 |
| 1930 | 43.37 | 27.63 | 15.74 |
| 1931 | 34.61 | 20.81 | 13.80 |
| 1932 | ------- | ------- | ------- |
| 1933 | ------- | ------- | ------- |
| 1934 | ------- | ------- | ------- |
| 1935 | ------- | ------- | ------- |
| 1936 | 62.91 | 33.65 | 29.26 |
| 1937 | 49.54 | 30.80 | 18.74 |
| 1938 | 57.69 | 32.48 | 25.21 |
| 1939 | 51.08 | 25.66 | 25.42 |
| 1940 | 39.96 | 18.49 | 21.47 |
| 1941 | 42.26 | 15.20 | 27.06 |
| 1942 | 49.38 | 20.24 | 29.14 |
| 1943 | 55.36 | 33.19 | 22.17 |
| Average | 49.67 | 26.80 | 22.87 |

Choccolocco Creek near Jenifer, Talladega County.

**Location.**—Lat. 33°34′, long. 85°56′, on line between secs. 5 and 8, T. 17 S., R. 7 E., at Louisville and Nashville Railroad bridge, three-quarters of a mile upstream from Salt Creek and 1½ miles north of Jenifer.

**Drainage area.**—275 square miles.

**Average runoff.**—14 years (1904-7, 1930-31, 1936-43), 18.83 inches.

**Remarks.**—Some regulation at low flow by small mills and diversions for municipal water supply for City of Anniston above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1930 | 52.77 | 21.85 | 30.92 |
| 1931 | 36.25 | 9.98 | 26.27 |
| 1932 | ------- | ------- | ------- |
| 1933 | ------- | ------- | ------- |
| 1934 | ------- | ------- | ------- |
| 1935 | ------- | ------- | ------- |
| 1936 | 54.78 | 28.86 | 25.92 |
| 1937 | 60.07 | 23.34 | 36.73 |
| 1938 | 55.94 | 22.13 | 33.81 |
| 1939 | 53.31 | 16.80 | 36.51 |
| 1940 | 48.60 | 18.10 | 30.50 |
| 1941 | 41.47 | 11.08 | 30.39 |
| 1942 | 53.53 | 14.91 | 38.62 |
| 1943 | 52.17 | 20.28 | 31.89 |
| Average | 50.89 | 18.73 | 32.16 |

MOBILE RIVER BASIN—Continued

Choccolocco Creek near Lincoln, Talladega County.

**Location.**—Lat. 33°34′, long. 86°08′, in SW¼ sec. 9, T. 17 S., R. 5 E., at bridge on State Highway 102, three-eighths of a mile downstream from Schmidt's mill, 4 miles south of Lincoln, 6 miles upstream from mouth, and 8 miles north of Talladega.

**Drainage area.**—491 square miles.

**Remarks.**—Diurnal fluctuations with some regulation at low flow by small mills above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1939 | 53.52 | 17.53 | 35.99 |
| 1940 | 47.85 | 17.96 | 29.89 |
| 1941 | 43.76 | 12.08 | 31.68 |
| 1942 | 51.52 | 15.36 | 36.16 |
| 1943 | 53.28 | 19.66 | 33.62 |
| Average | 49.99 | 16.52 | 33.47 |

Talladega Creek near Alpine, Talladega County.

**Location.**—Lat. 33°21′, long. 86°14′, in SE¼ sec. 21, T. 19 S., R. 4 E., at county highway bridge, half a mile downstream from Southern Railway bridge, 1 mile north of Alpine, 9 miles southwest of Talladega, and 11 miles upstream from mouth.

**Drainage area.**—158 square miles .

**Average runoff.**—8 years (1901-04, 1940-43), 19.30 inches.

**Remarks.**—Some diurnal fluctuations caused by grist mill above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 46.34 | 17.56 | 28.78 |
| 1941 | 47.04 | 13.38 | 33.66 |
| 1942 | 48.57 | 18.82 | 29.75 |
| 1943 | 55.73 | 20.71 | 35.02 |
| Average | 49.42 | 17.62 | 31.80 |

MOBILE RIVER BASIN—Continued

Tallapoosa River near Ofelia (western Randolph County).

**Location.**—Lat. 33°20′, long. 85°35′, in SW¼ sec. 34, T. 19 S., R. 10 E., at county highway bridge, 1 mile northwest of Ofelia, 1½ miles upstream from Little Tallapoosa River, and 9 miles east of Lineville.

**Drainage area.**—787 square miles.

**Remarks.**—Slight diurnal fluctuation caused by mills above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 46.18 | 17.11 | 29.07 |
| 1941 | 42.20 | 11.44 | 30.76 |
| 1942 | 54.02 | 17.41 | 36.61 |
| 1943 | 50.54 | 21.80 | 28.74 |
| Average | 48.24 | 16.94 | 31.30 |

Tallapoosa River at Wadley, Randolph County.

**Location.**—Lat. 33°08′, long. 85°34′, in sec. 12, T. 22 S., R. 10 E., at Wadley, a quarter of a mile upstream from bridge on State Highway 65, and three-quarters of a mile downstream from Beaverdam Creek.

**Drainage area.**—1,660 square miles.

**Average runoff.**—20 years (1924-43), 19.80 inches.

**Remarks.**—Some diurnal fluctuation during extremely low flow caused by small mills above station.

**Cooperation.**—Records collected by Alabama Power Co., under general supervision of U. S. Geological Survey, in connection with a Federal Power Commission project.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1929 | 58.70 | 27.55 | 31.15 |
| 1930 | 54.27 | 21.75 | 32.52 |
| 1931 | 36.94 | 12.06 | 24.88 |
| 1932 | 64.72 | 24.10 | 40.62 |
| 1933 | 66.23 | 32.78 | 33.45 |
| 1934 | 44.03 | 14.30 | 29.73 |
| 1935 | 54.62 | 19.67 | 34.95 |
| 1936 | 58.16 | 29.03 | 29.13 |
| 1937 | 58.03 | 24.12 | 33.91 |
| 1938 | 52.36 | 18.87 | 33.49 |
| 1939 | 59.12 | 19.58 | 39.54 |
| 1940 | 45.86 | 16.79 | 29.07 |
| 1941 | 42.44 | 11.72 | 30.72 |
| 1942 | 53.98 | 18.19 | 35.79 |
| 1943 | 51.04 | 22.22 | 28.82 |
| Average | 53.37 | 20.85 | 32.52 |

MOBILE RIVER BASIN—Continued

Little Tallapoosa River near Wedowee, Randolph County.

**Location.**—Lat. 33°21′, long.83°33′, in NE¼ sec. 25, T. 19 S., R. 10 E., at county bridge, 4½ miles northwest of Wedowee and 5½ miles upstream from mouth.

**Drainage area.**—592 square miles.

**Remarks.**—Occasional regulation at low flow by small mills above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 44.52 | 15.36 | 29.16 |
| 1941 | 39.88 | 11.09 | 28.79 |
| 1942 | 52.32 | 17.63 | 34.69 |
| 1943 | 50.08 | 23.21 | 26.87 |
| Average | 46.70 | 16.82 | 29.88 |

Uphapee (Eufaubee) Creek near Tuskegee, Macon County.

**Location.**—Lat. 32°28′, long. 85°42′, on east line sec. 12, T. 17 N., R. 23 E., at bridge on State Highway 81, 1 mile upstream from Red Creek, 1¼ miles upstream from bridge of Western Railway of Alabama, and 4 miles north of Tuskegee.

**Drainage area.**—331 square miles.

**Remarks.**—Occasional fluctuations at low flow caused by small plants above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 49.48 | 15.64 | 33.84 |
| 1941 | 43.60 | 8.59 | 35.01 |
| 1942 | 57.93 | 18.84 | 39.09 |
| 1943 | 56.62 | 25.23 | 31.39 |
| Average | 51.91 | 17.08 | 34.83 |

Autauga Creek at Prattville, Autauga County.

**Location.**—Lat. 32°27′30″, long. 86°28′30″, in N½ sec. 17, T. 17 N., R. 16 E., at Bridge Street Bridge in Prattville, 500 feet downstream from dam and 5 miles upstream from mouth.

**Drainage area.**—119 square miles.

**Remarks.**—Extensive diurnal fluctuations and occasional regulation caused by small plant 500 feet upstream.

MOBILE RIVER BASIN—Continued

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 49.82 | 26.42 | 23.40 |
| 1941 | 41.95 | 18.28 | 23.67 |
| 1942 | 58.60 | 22.63 | 35.97 |
| 1943 | 51.60 | 22.48 | 29.12 |
| Average | 50.49 | 22.45 | 28.04 |

Big Swamp Creek near Hayneville, Lowndes County.

**Location.**—Lat. 32°11′, long. 86°36′, in sec. 19, T. 14 N., R. 15 E., at bridge on State Highway 11, 1 mile downstream from Fort Deposit Creek and 1½ miles southwest of Hayneville.

**Drainage area.**—122 square miles.

**Remarks.**—Creek frequently goes dry.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 43.68 | 18.67 | 25.01 |
| 1941 | 41.27 | 9.71 | 31.56 |
| 1942 | 57.74 | 18.49 | 39.25 |
| 1943 | 54.18 | 18.29 | 35.89 |
| Average | 49.22 | 16.29 | 32.93 |

Mulberry River at Jones (Autauga and Dallas counties.)

**Location.**—Lat. 32°35′, long. 86°54′, in E½ sec. 31, T. 19 N., R. 12 E., at bridge on county highway, 0.4 mile west of Jones, 6 miles upstream from Buck Creek, and 11 miles upstream from mouth.

**Drainage area.**—205 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1939 | 68.93 | 31.30 | 37.63 |
| 1940 | 51.79 | 23.61 | 28.18 |
| 1941 | 43.90 | 16.85 | 27.05 |
| 1942 | 56.53 | 21.74 | 34.79 |
| 1943 | 51.03 | 18.91 | 32.12 |
| Average | 54.44 | 22.48 | 31.96 |

MOBILE RIVER BASIN—Continued

Cahaba River near Acton (Jefferson and Shelby Counties)

(Adjusted for Diversion)

**Location.**—Lat. 33°22′, long. 86°49′, in SE¼ sec. 23, T. 19 S., R. 3 W., at bridge on U. S. Highway 31, half a mile upstream from Patton Creek, 1 mile northwest of Acton, and 16 miles south of Birmingham.

**Drainage area.**—229 square miles.

**Remarks.**—Records adjusted for diversion of between 34 and 54 second-feet diverted above station by Birmingham Water Works Co. Approximately 5 second-feet from this diversion is returned below station. Flow partly regulated by Purdy Lake (capacity, 17,400 acre-feet) on Little Cahaba River.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| | | Adjusted for Diversion | |
| 1939 | 57.12 | 21.34 | 35.78 |
| 1940 | 47.54 | 24.55 | 22.99 |
| 1941 | 53.76 | 17.55 | 36.21 |
| 1942 | 47.47 | 13.81 | 33.66 |
| 1943 | 50.25 | 24.78 | 25.47 |
| Average | 51.23 | 20.41 | 30.83 |

MOBILE RIVER BASIN—Continued

Cahaba River at Centerville, Bibb County.

**Location.**—Lat. 32°56′, long. 87°08′, in E½ sec. 26, T. 23 N., R. 9 E., at bridge on State Highway 6, a quarter of a mile west of Centerville, half a mile upstream from Gulf, Mobile and Ohio Railroad bridge, and 2½ miles upstream from Sandy Creek.

**Drainage area.**—1,030 square miles.

**Average runoff.**—16 years (1902-07, 1930-31, 1936-43), 21.20 inches.

**Remarks.**—Some regulation and diversion above station (see "Remarks" for preceding station, near Acton).

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1930 | 63.32 | 30.11 | 33.21 |
| 1931 | 38.70 | 10.96 | 27.74 |
| 1932 | ------- | ------- | ------- |
| 1933 | ------- | ------- | ------- |
| 1934 | ------- | ------- | ------- |
| 1935 | ------- | ------- | ------- |
| 1936 | 60.42 | 24.64 | 35.78 |
| 1937 | 58.12 | 24.71 | 33.41 |
| 1938 | 61.07 | 23.62 | 37.45 |
| 1939 | 63.96 | 22.83 | 41.13 |
| 1940 | 50.18 | 23.11 | 27.07 |
| 1941 | 51.39 | 15.53 | 35.86 |
| 1942 | 52.83 | 16.27 | 36.56 |
| 1943 | 53.47 | 22.46 | 31.01 |
| Average | 55.35 | 21.42 | 33.92 |

Cahaba River near Marion Junction, Dallas County.

**Location.**—Lat. 32°27′, long. 87°11′, on line between secs. 16 and 21, T. 17 N., R. 9 E., at bridge on U. S. Highway 80, half a mile upstream from Southern Railway bridge, 3 miles downstream from Oakmulgee Creek, 3½ miles east of Marion Junction, and 20 miles upstream from mouth.

**Drainage area.**—1,780 square miles.

**Remarks.**—Some regulation and diversion above station (see "Remarks" for station near Acton).

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 48.72 | 21.81 | 26.91 |
| 1941 | 46.01 | 13.94 | 32.07 |
| 1942 | 57.02 | 16.68 | 40.34 |
| 1943 | 52.78 | 21.03 | 31.75 |
| Average | 51.13 | 18.36 | 32.77 |

MOBILE RIVER BASIN—Continued

Sipsey River near Elrod, Tuscaloosa County.

**Location.**—Lat. 33°15′, long. 87°46′, in NE¼ sec. 3, T. 21 S., R. 12 W., at bridge on U. S. Highway 82, a quarter of a mile upstream from Gulf, Mobile and Ohio Railroad bridge, 1 mile east of Elrod, and 2 miles downstream from Box Creek.

**Drainage area.**—515 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1929 | 54.05 | 18.21 | 35.84 |
| 1930 | 50.98 | 25.24 | 25.74 |
| 1931 | 40.34 | 13.06 | 27.28 |
| 1932 | ------ | ------ | ------ |
| 1933 | ------ | ------ | ------ |
| 1934 | ------ | ------ | ------ |
| 1935 | ------ | ------ | ------ |
| 1936 | ------ | ------ | ------ |
| 1937 | ------ | ------ | ------ |
| 1938 | ------ | ------ | ------ |
| 1939 | ------ | ------ | ------ |
| 1940 | 50.67 | 18.69 | 31.98 |
| 1941 | 43.98 | 12.41 | 31.57 |
| 1942 | 43.66 | 12.54 | 31.12 |
| 1943 | 44.86 | 14.17 | 30.69 |
| Average | 46.93 | 16.33 | 30.60 |

## MOBILE RIVER BASIN—Continued

### Mulberry Fork of Warrior River near Garden City (Cullman and Blount Counties.)

**Location.**—Lat. 34°00′, long. 86°45′, in NE¼ sec. 16, T. 12 S., R. 2 W., at bridge on U. S. Highway 31, 1,000 feet downstream from Louisville and Nashville Railroad bridge, 1 mile southwest of Garden City, and 5½ miles downstream from Mud Creek.

**Drainage area.**—365 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1929 | 62.36 | 27.95 | 34.41 |
| 1930 | 64.21 | 29.53 | 34.68 |
| 1931 | 41.24 | 11.49 | 29.75 |
| 1932 | ------ | ------ | ------ |
| 1933 | 59.26 | 33.05 | 26.21 |
| 1934 | 49.02 | 16.57 | 32.45 |
| 1935 | 49.31 | 23.85 | 25.46 |
| 1936 | 57.20 | 28.80 | 28.40 |
| 1937 | 55.18 | 23.91 | 31.27 |
| 1938 | 51.03 | 18.82 | 32.21 |
| 1939 | 59.78 | 25.68 | 34.10 |
| 1940 | 45.32 | 20.56 | 24.76 |
| 1941 | 46.29 | 14.05 | 32.24 |
| 1942 | 42.96 | 15.87 | 27.09 |
| 1943 | 47.46 | 21.90 | 25.56 |
| Average | 52.19 | 22.29 | 29.90 |

### Sipsey Fork of Warrior River, near Arley, Winston County.

**Location.**—Lat. 33°59′, long. 87°13′, in N½ sec. 19, T. 12 S., R. 6 W., at Duncan Bridge, 3 miles downstream from Clear Creek and 5 miles south of Arley.

**Drainage area.**—537 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1937 | 57.97 | 21.94 | 36.03 |
| 1938 | 58.97 | 22.57 | 36.40 |
| 1939 | 63.52 | 28.42 | 35.10 |
| 1940 | 46.91 | 18.95 | 27.96 |
| 1941 | 40.02 | 10.68 | 29.34 |
| 1942 | 40.66 | 9.33 | 31.33 |
| 1943 | 44.25 | 13.11 | 31.14 |
| Average | 50.33 | 17.86 | 32.47 |

MOBILE RIVER BASIN—Continued

Clear Creek at Falls City, Winston County.

**Location.**—Lat. 34°02′, long. 87°16′, in NE¼ sec. 9, T. 12 S., R. 7 W., at bridge on county highway, a quarter of a mile upstream from Clear Creek Falls, half a mile south of Falls City, and 2 miles upstream from mouth.

**Drainage area.**—151 square miles.

**Remarks.**—Occasional diurnal fluctuation at low flow.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 48.48 | 21.92 | 26.56 |
| 1941 | 44.41 | 13.04 | 31.37 |
| 1942 | 44.95 | 11.24 | 33.71 |
| 1943 | 48.56 | 13.74 | 34.82 |
| Average | 46.60 | 14.98 | 31.62 |

Blackwater Creek near Manchester, Walker County.

**Location.**—Lat. 33°55′, long. 87°15′, in SE¼ sec. 15, T. 13 S., R. 7 W., at bridge on county highway, 2 miles east of Manchester and 5½ miles north of Jasper.

**Drainage area.**—177 square miles.

**Remarks.**—Occasional regulation at low flow caused by small dam 2 miles above station.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1939 | 62.78 | 29.05 | 33.73 |
| 1940 | 51.49 | 21.97 | 29.52 |
| 1941 | 42.43 | 10.81 | 31.62 |
| 1942 | 44.12 | 11.21 | 32.91 |
| 1943 | 45.81 | 15.22 | 30.59 |
| Average | 49.33 | 17.65 | 31.68 |

## MOBILE RIVER BASIN—Continued

### Locust Fork of Warrior River at Trafford, Jefferson County.

**Location.**—Lat. 33°50′, long. 86°45′, in SW¼ sec. 9, T. 14 S., R. 2 W., at highway bridge three-quarters of a mile northwest of Trafford, 1½ miles east of Coaldale and 2¾ miles upstream from Gurley Creek.

**Drainage area.**—622 square miles.

**Remarks.**—Diversion above station for industrial water supply for City of Birmingham.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1931 | 41.15 | 12.54 | 28.61 |
| 1932 | ------ | ------ | ------ |
| 1933 | 59.54 | 28.43 | 31.11 |
| 1934 | 51.45 | 15.88 | 35.57 |
| 1935 | 53.35 | 26.42 | 26.93 |
| 1936 | 57.10 | 27.35 | 29.75 |
| 1937 | 57.24 | 26.45 | 30.79 |
| 1938 | 52.20 | 22.27 | 29.93 |
| 1939 | 54.36 | 18.54 | 35.82 |
| 1940 | 44.12 | 17.99 | 26.13 |
| 1941 | 47.19 | 13.41 | 33.78 |
| 1942 | 47.01 | 16.22 | 30.79 |
| 1943 | 50.73 | 24.49 | 26.24 |
| Average | 51.29 | 20.83 | 30.46 |

### North River near Samantha, Tuscaloosa County.

**Location.**—Lat. 33°28′45″, long. 87°35′50″, in SW¼ sec. 16, T. 18 S., R. 10 W., at county highway bridge, half a mile east of Crump's store, 1¼ miles upstream from Cripple Creek, and 4 miles north of Samantha.

**Drainage area.**—220 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1940 | 51.52 | 20.34 | 31.18 |
| 1941 | 44.08 | 10.70 | 33.38 |
| 1942 | 45.11 | 13.87 | 31.24 |
| 1943 | 45.77 | 15.58 | 30.19 |
| Average | 46.62 | 15.12 | 31.50 |

MOBILE RIVER BASIN—Continued

Sucarnochee River near Livingston, Sumter County

**Location.**—Lat. 32°34′, long. 88°12′, in SW¼ sec. 33, T. 19 N., R. 2 W., at bridge on U. S. Highway 80, 500 feet upstream from Southern Railway bridge, three-quarters of a mile southwest of Livingston, and 9 miles upstream from Alamuchee Creek.

**Drainage area.**—635 square miles.

| Year ending Sept. 30 | Precipitation (inches) P | Runoff (inches) R | Water Loss (inches) P-R |
|---|---|---|---|
| 1939 | 59.19 | 17.55 | 41.64 |
| 1940 | 56.28 | 17.76 | 38.52 |
| 1941 | 48.41 | 11.07 | 37.34 |
| 1942 | 52.01 | 11.02 | 40.99 |
| 1943 | 44.66 | 11.30 | 33.36 |
| Average | 52.11 | 13.74 | 38.37 |

Table 1

CONECUH RIVER NEAR ANDALUSIA, ALA.

Variation of Computed Annual Runoff from Observed Runoff

| Year ending Sept. 30 | Precipitation in inches | Observed runoff in inches | Computed runoff in inches (K=.46) | Computed runoff minus obs. runoff in inches | Percent Variation |
|---|---|---|---|---|---|
| 1930 | 56.18 | 22.73 | 20.34 | —2.39 | —10.5 |
| 1931 | 51.33 | 17.64 | 17.72 | + .08 | + .5 |
| 1932 | 50.37 | 13.24 | 17.20 | +3.96 | +29.9 |
| 1933 | 60.34 | 22.92 | 22.58 | — .34 | — 1.5 |
| 1934 | 45.82 | 10.99 | 14.74 | +3.75 | +34.1 |
| 1935 | 56.10 | 16.77 | 20.29 | +3.52 | +21.0 |
| 1936 | 62.55 | 26.86 | 23.78 | —3.08 | —11.5 |
| 1937 | 61.15 | 23.70 | 23.02 | — .68 | — 2.9 |
| 1938 | 56.91 | 25.60 | 20.73 | —4.87 | —19.0 |
| 1939 | 64.00 | 23.03 | 24.56 | +1.53 | + 6.6 |
| 1940 | 48.85 | 19.16 | 16.38 | —2.78 | —14.5 |
| 1941 | 47.17 | 11.19 | 15.47 | +4.28 | +38.2 |
| 1942 | 58.78 | 19.40 | 21.74 | +2.34 | +12.1 |
| 1943 | 60.47 | 25.87 | 22.65 | —3.22 | —12.4 |
| Average | 55.72 | 19.94 | 20.09 | 2.63* | 15.3* |

*Average of numerical differences; algebraic signs ignored.

Note.—Computed runoff is from formula (Runoff = Precipitation—10 inches — K [Precipitation]) in which K = 0.46 is based on 4 years of record 1940-1943.

Table 2

TALLAPOOSA RIVER AT WADLEY, ALA.

Variation of Computed Annual Runoff from Observed Runoff

| Year ending Sept. 30 | Precipitation in inches | Observed runoff in inches | Computed runoff in inches (K = .45) | Computed runoff minus obs. runoff in inches | Percent Variation |
|---|---|---|---|---|---|
| 1929 | 58.70 | 27.55 | 22.28 | —5.27 | —19.1 |
| 1930 | 54.27 | 21.75 | 19.85 | —1.90 | — 8.7 |
| 1931 | 36.94 | 12.06 | 10.32 | —1.74 | —14.4 |
| 1932 | 64.72 | 24.10 | 25.60 | +1.50 | + 6.2 |
| 1933 | 66.23 | 32.78 | 26.43 | —6.35 | —19.4 |
| 1934 | 44.03 | 14.30 | 14.22 | — .08 | — .5 |
| 1935 | 54.62 | 19.67 | 20.04 | + .37 | + 1.9 |
| 1936 | 58.16 | 29.03 | 21.99 | —7.04 | —24.3 |
| 1937 | 58.03 | 24.12 | 21.92 | —2.20 | — 9.1 |
| 1938 | 52.36 | 18.87 | 18.80 | — .07 | — .4 |
| 1939 | 59.12 | 19.58 | 22.52 | +2.94 | +15.0 |
| 1940 | 45.86 | 16.79 | 15.22 | —1.57 | — 9.4 |
| 1941 | 42.44 | 11.72 | 13.34 | +1.62 | +13.8 |
| 1942 | 53.98 | 18.19 | 19.69 | +1.50 | + 8.2 |
| 1943 | 51.04 | 22.22 | 18.07 | —4.15 | —18.7 |
| Average | 53.37 | 20.85 | 19.35 | 2.55* | 11.3* |

*Average of numerical differences; algebraic signs ignored.

Note.—Computed runoff is from formula (Runoff = Precipitation—10 inches — K [Precipitation]) in which K = 0.45 is based on 4 years of record 1940-1943.

Table 3

MULBERRY FORK NEAR GARDEN CITY, ALA.

Variation of Computed Annual Runoff from Observed Runoff

| Year ending Sept. 30 | Precipitation in inches | Observed runoff in inches | Computed runoff in inches (K=.38) | Computed runoff minus obs. runoff in inches | Percent Variation |
|---|---|---|---|---|---|
| 1929 | 62.36 | 27.95 | 28.66 | + .71 | + 2.5 |
| 1930 | 64.21 | 29.53 | 29.81 | + .28 | + .9 |
| 1931 | 40.17 | 11.49 | 14.91 | +3.42 | +29.8 |
| 1932 | | | | | |
| 1933 | 59.26 | 33.05 | 26.74 | —6.31 | —19.1 |
| 1934 | 49.02 | 16.57 | 20.39 | +3.82 | +23.1 |
| 1935 | 49.31 | 23.85 | 20.57 | —3.28 | —13.8 |
| 1936 | 57.20 | 28.80 | 25.46 | —3.34 | —11.6 |
| 1937 | 55.18 | 23.91 | 24.21 | + .30 | + 1.3 |
| 1938 | 51.03 | 18.82 | 21.64 | +2.82 | +15.0 |
| 1939 | 59.78 | 25.68 | 27.06 | +1.38 | + 5.4 |
| 1940 | 45.32 | 20.56 | 18.10 | —2.46 | —12.0 |
| 1941 | 46.12 | 14.05 | 18.59 | +4.54 | +32.3 |
| 1942 | 42.96 | 15.87 | 16.64 | + .77 | + 4.9 |
| 1943 | 47.46 | 21.90 | 19.43 | —2.47 | —11.3 |
| Average | 52.10 | 22.29 | 22.30 | 2.56* | 13.1* |

*Average of numerical differences; algebraic signs ignored.

Note.—Computed runoff is from formula (Runoff = Precipitation—10 inches — K [Precipitation]) in which K = 0.38 is based on 4 years of record 1940-1943.

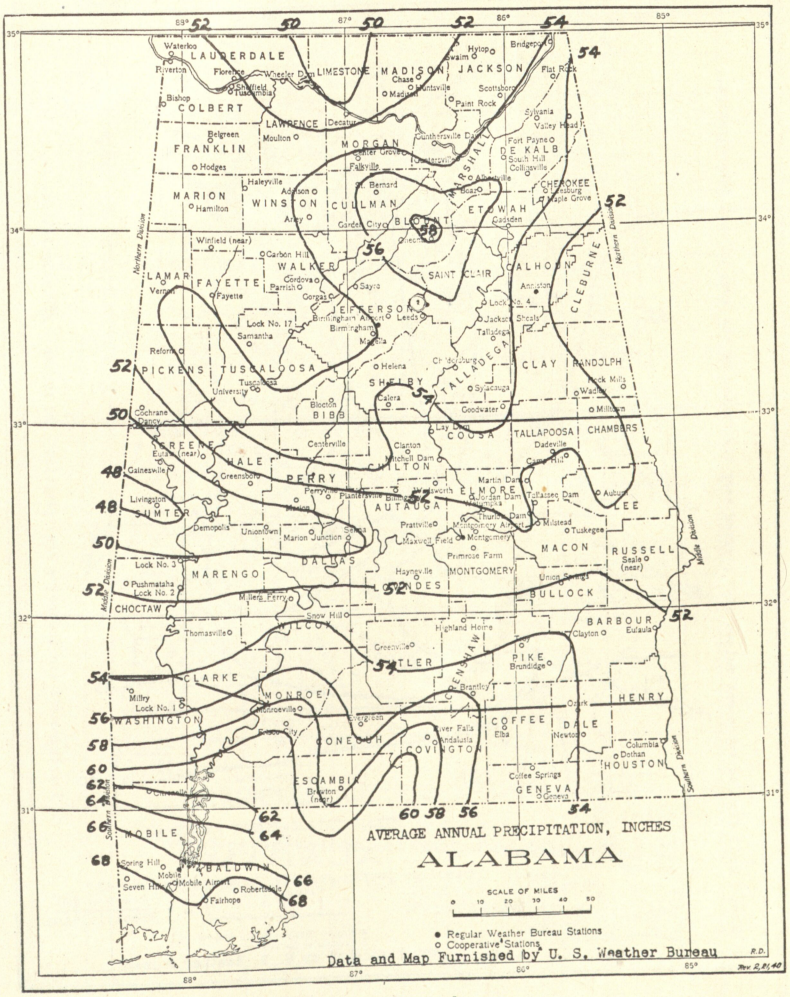
AVERAGE ANNUAL PRECIPITATION, INCHES
ALABAMA
SCALE OF MILES
0 10 20 30 40 50
Regular Weather Bureau Stations
Cooperative Stations
Data and Map Furnished by U. S. Weather Bureau
LAUDERDALE
LIMESTONE
MADISON
JACKSON
COLBERT
LAWRENCE
FRANKLIN
MORGAN
MARION
WINSTON
CULLMAN
BLOUNT
ETOWAH
DE KALB
CHEROKEE
WALKER
SAINT CLAIR
CALHOUN
CLEBURNE
LAMAR
FAYETTE
JEFFERSON
PICKENS
TUSCALOOSA
SHELBY
TALLADEGA
CLAY
RANDOLPH
GREENE
HALE
PERRY
BIBB
COOSA
TALLAPOOSA
CHAMBERS
CHILTON
SUMTER
AUTAUGA
ELMORE
LEE
MACON
RUSSELL
DALLAS
MONTGOMERY
MARENGO
LOWNDES
BULLOCK
CHOCTAW
WILCOX
BARBOUR
CLARKE
BUTLER
PIKE
MONROE
HENRY
WASHINGTON
CONECUH
COVINGTON
COFFEE
DALE
ESCAMBIA
GENEVA
HOUSTON
MOBILE
BALDWIN

Plate 1

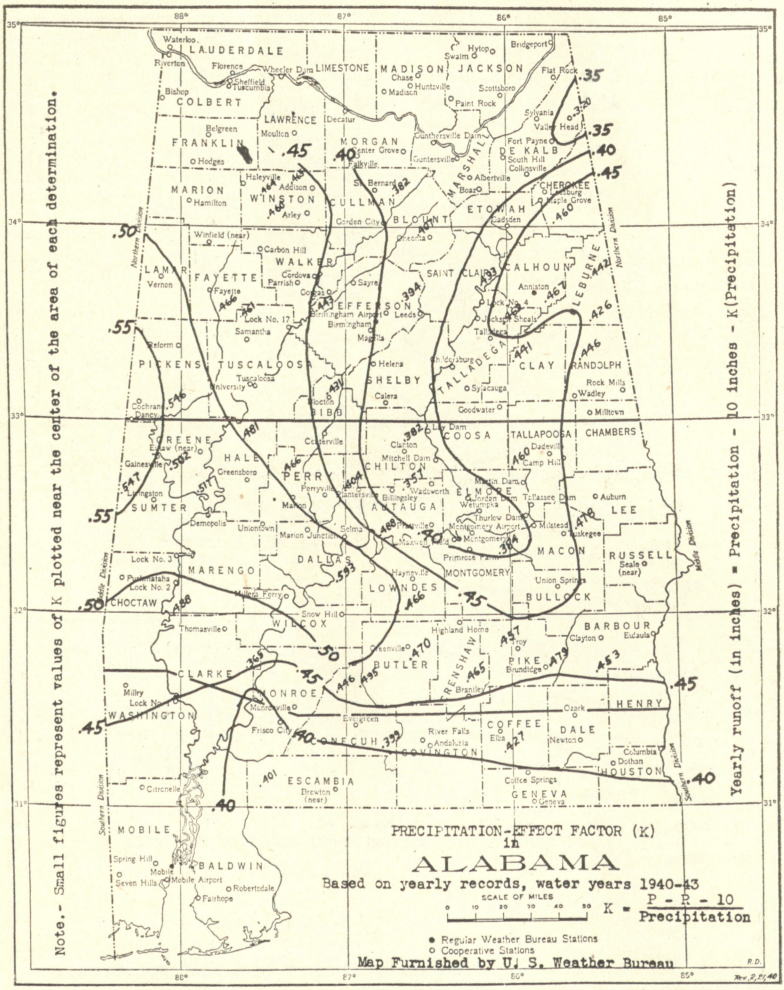
PRECIPITATION-EFFECT FACTOR (K)
in
ALABAMA
Based on yearly records, water years 1940-43
SCALE OF MILES
0 10 20 30 40 50
K = P - R - 10 / Precipitation
Regular Weather Bureau Stations
Cooperative Stations
Map Furnished by U. S. Weather Bureau
Note.- Small figures represent values of K plotted near the center of the area of each determination.
Yearly runoff (in inches) = Precipitation - 10 inches - K(Precipitation)
LAUDERDALE
LIMESTONE
MADISON
JACKSON
COLBERT
LAWRENCE
FRANKLIN
MORGAN
MARSHALL
DE KALB
MARION
WINSTON
CULLMAN
ETOWAH
CHEROKEE
BLOUNT
WALKER
SAINT CLAIR
CALHOUN
CLEBURNE
LAMAR
FAYETTE
JEFFERSON
PICKENS
TUSCALOOSA
SHELBY
TALLADEGA
CLAY
RANDOLPH
GREENE
HALE
PERRY
BIBB
COOSA
TALLAPOOSA
CHAMBERS
CHILTON
SUMTER
AUTAUGA
ELMORE
LEE
MACON
RUSSELL
MARENGO
DALLAS
MONTGOMERY
LOWNDES
BULLOCK
CHOCTAW
WILCOX
BARBOUR
CLARKE
BUTLER
CRENSHAW
PIKE
MONROE
HENRY
WASHINGTON
COFFEE
DALE
ESCAMBIA
HOUSTON
GENEVA
MOBILE
BALDWIN
Northern Division
Middle Division
Southern Division

Plate 2

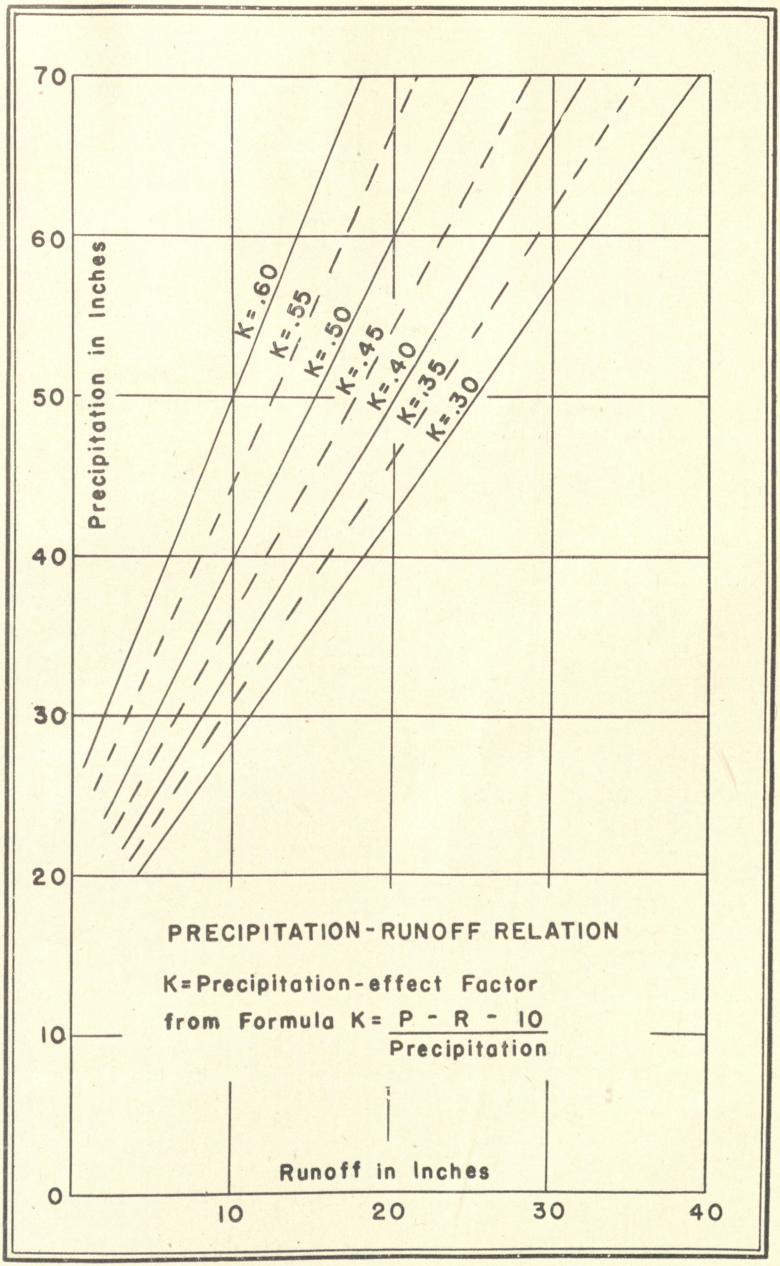
70
60
50
40
30
20
10
0
Precipitation in Inches
K=.60
K=.55
K=.50
K=.45
K=.40
K=.35
K=.30
PRECIPITATION-RUNOFF RELATION
K=Precipitation-effect Factor
from Formula K= P - R - 10 / Precipitation
Runoff in Inches
10
20
30
40

Plate 3

DEC1960